MERYCISMUS OR RUMINATION, WITH A REPORT OF TWO CASES.[1]

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AMONG the aberrations of function presented by the human stomach, none is more interesting or more strange than that known as rumination or merycismus (*merukismos*, ruminaton).

Although the ancient writers, particularly Aristotle, were acquainted with rumination in animals, they have left no records indicating that they possessed any knowledge of its occurrence in man. The first author to mention it was the great Italian anatomist, Fabricius ab Aquapendente,[2] the teacher of William Harvey, who lived at Padua towards the close of the sixteenth and the commencement of the seventeenth century. In one of the chapters of his book, entitled, "De Ruminatione,"[3] he describes with much clearness two cases of merycismus—the one was a nobleman who is said to have had two horns on his forehead; the second a Paduan monk who ruminated because his father had a little horn on the forehead—"*quod ejus pater paulo supra frontem in capite corniculum durissimum.*"

Since Fabricius' time quite a large number of cases have been reported, particularly by European writers, but only a few instances have been observed in this country. The literature has been carefully reviewed by Johannessen[4] and by Singer,[5] to whose monographs the writer would refer for a more extended bibliography than the one given at the end of this paper.

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[1] Read before the Philadelphia Neurological Society, March, 1895.

[2] Fabricius ab Aquapendente, Hieronymus. *Opera omnia anatomica et Physiologica cum Præfatione.* J. Bohnii, Lipsiæ, 1687, p. 135.

[3] Fabricius gives the following excellent definition of rumination: "Ruminatio igitur nihil aliud est, quam cibi in os regestio-vel clarius, ruminatio est localis cibi motus quo sursum per gulam in os regeritur, manditur, et laevigatur, inde rursus devoratur." "De Ruminatione." p. 135.

[4] Johannessen. *Zeitsch. f. Klin. Medicin.*, Bd. x., p. 264, *et seq.*

[5] Singer. *Deutsch. Archiv. f. Klin. Medicin.*, Bd. li., 1893, p. 472, *seq.*

We may define rumination as a periodic regurgitation of the food unattended by nausea, retching, or disgust, the regurgitated material being either voluntarily ejected from the mouth or again swallowed, remastication not being an essential part of the act.

Writers are generally in accord in considering this regurgitation analogous to the process of rumination in the lower animals. In them we find that rumination is peculiar to certain classes of herbivora, being evidently a developmental or evolved character, the result of adaptation to environment. Herbivora, particularly the ruminating genera, in the wild state are compelled to ingest large quantities of coarse food very hastily, because, to use the words of Robert Meade Smith,[6] "in eluding their enemies, they rely chiefly upon sharpness of vision, acuteness of hearing and agility." They have in consequence come to be provided with a peculiarly complicated and capacious stomach, which in the majority of ruminants consists of four compartments: the rumen or paunch, the honey-comb bag or reticulum, the psalter, omasum, or maniplies, and the abomasum or rennet. Of these the last is alone comparable to the human stomach.

The food after its imperfect primary mastication, passes into the first and second stomachs, while fluid and finely divided particles may at once enter all four compartments. Rumination begins a variable time after the meal. The bolus is formed and regurgitated into the mouth, remasticated, and then swallowed in a state of fine subdivision, permitting it to pass through the narrow aperture between the reticulum and maniplies. From the latter it is transmitted to the true stomach to be there subjected to the action of the proper digestive juices.

The factors bringing about this complicated process are principally two—a lessening of the intra-thoracic pressure and an aspiration of the gastric contents.

At the moment at which regurgitation begins the glottis is closed and the diaphragm is forcibly contracted; this leads to an enlargement of the thoracic cavity and a consequent rarefaction of the air. The decrease in pressure causes, on the one hand, an aspiration of the blood in the jugular veins into the heart; on the other, a suction of the gastric contents into the esophagus, the cardiac orifice being synchronously relaxed. As soon as the bolus has entered the gullet, it is carried upward by an antiperistaltic movement.

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[6] Robert Meade Smith. *Physiology of the Domestic Animals.*

The stomach itself is probably passive, as we may infer from Magendie's famous experiment on the mechanism of vomiting. Magendie found that when he excised the stomach of a dog and substituted for it a bladder, the injection of tartar emetic was just as capable of producing vomiting as before. Regarding the participation of the abdominal pressure, writers are not in complete unison, some holding that it is necessary, others that it is not.

Rumination is a reflex act and is presided over by a centre situated in the medulla oblongata, the afferent pathway being constituted by the pneumogastric nerves, the efferent by the phrenic nerves and the motor nerves of the abdominal muscles, the stomach, and the esophagus.

As far as the process of rumination has been studied in man, it has been found identical in its mechanism with that of herbivora, the factors of paramount importance being the closure of the glottis and the descent of the diaphragm. But while the mode of its production has been quite fully elucidated, we are as yet ignorant of its ultimate cause.

The anatomic lesions that have been noted have thrown no light on the origin of the phenomenon.

Arnold[7] and Luschka[8] found in their respective cases dilatation of the lower end of the esophagus, the so-called *antrum cardiacum*, and also observed an unusual thickness of the internal branch of the spinal accessory nerve; that which unites with vagus. As in ruminating animals the gullet terminates in a funnel-shaped expansion (the *gouttière esophagienne* of the French) and as in them the inner branch of the accessory nerve is very thick, Arnold and Luschka concluded that the existence of these anomalies accounted for rumination in man.

But unfortunately for this theory the cardiac antrum has been found in cases that did not present merycism during life, while in other instances the esophagus was normal; and as regards the hypertrophy of the nerve, its size is known to vary considerably under normal conditions.

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[7] Arnold. *Untersuchungen im Gebiete der Anatomie und Physiologie*, Bd. i., p. 211. Zürich, 1838. Quoted by Singer.

[8] Luschka. *Virchow's Archiv.*, Bd. xi., 1857, p. 247. Quoted by Singer.

In Singer's cases Von Hacker was able to determine, by esophagoscopic examination made *intra vitam*, a probable dilatation of the lower end of the esophagus, which Singer attributes to the patients' habit of swallowing imperfectly masticated pieces of food. In a few cases the stomach has been found dilated.

Bourneville and Séglas,[9] in two autopsies, found both stomach and esophagas normal.

All these contradictory observations prove that there is no constant anatomic substratum, whence it follows that we must rank the condition, at least for the time being, among the functional disorders of the stomach, and consider it, as Oser[10] has done, a motor neurosis.

As both experimental examination and esophagoscopy have shown that the cardia is invariably closed toward the stomach, except during the transit of the food, we must of necessity believe that in rumination there is, as in vomiting, a temporary relaxation of the orifice. That a permanent insufficiency exists, as has been claimed, is unlikely, as this would inevitably lead to a perpetual regurgitation of everything ingested.

An important element in the causation of rumination is unquestionably the neurotic constitution. Nearly all writers are agreed on that point.

A German physician, Näcke,[11] who is a sufferer from the affection, and who has studied his case minutely, is convinced of its relation to neurasthenia. Whenever his nervous system is most unstable, the rumination is most energetic.

The frequency of the disease in the educated—physicians, students, and clerks—would also indicate its alliance to the neurasthenic state.

In a few instances, notably in the case reported by Körner,[12] in which a governess taught the practice to her two wards, the habit was acquired by imitation.

Bourneville and Séglas, as well as others, have pointed out its occurence in idiots and the insane. In such cases it may be dependent upon bulimia.

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[9] Bourneville et Séglas. *Du Merycisme.* Quoted by Singer.

[10] Oser. *Die Neurosen des Magens und ihre Behandlung.* Wien, 1885.

[11] Näcke. *Neurolog. Centralblatt*, 1893, xiii., p. 2.

[12] Körner. *Archiv f. Klin. Medicin*, Bd. xxxiii. Quoted by Singer.

The disease is far more common in males than in females; as a rule it causes no serious disturbance unless the patient habitually rejects the regurgitated food. With but few exceptions it seems to have resisted every form of treatment. The phenomenon is not generally under the control of the will.

Something ought to be said concerning the condition of the gastric juice;—here again we meet with the same variability as in the morbid lesions, perhaps in the majority there is subacidity, in some even achlorhydria, as in the two cases here reported, although a sufficient number of analyses was not made in them to predicate positively the absence of hydrochloric acid. In a few instances, as in the case of Alt,[13] hyperacidity was noted. It was shown by Linossier and Lemoine,[14] that the acidity varies in the same case on different examinations.

The symptomatology is pretty constant. The writer cannot better describe it than by detailing the histories of two cases that he has recently observed.

Case I. Mr. Wm. S.[15] was sent for a physical examination by Dr. Stem, of Berlin, N. J. He is 44 years of age, married, an Englishman by birth, an engineer by occupation.

Family history.—Father died of asthma, mother of consumption. There is no neurosis in the family, no one suffers, as far as he knows, from stomach troubles.

Previous history.—At the age of eighteen he had white swelling of the left knee; suppuration ensued and continued for many years; after a period of arrest, the sinus opened again and continues to discharge up to the present time.

He came to this country at the age of sixteen years, has always worked faithfully at his trade, was healthy, not intemperate in the use of liquor or tobacco, nor guilty of sexual excesses. He has been married twice, and is the father of twelve children, of whom eight are living and well. During the last three years he has had a number of pulmonary hemorrhages; has had cough and has lost flesh; night sweats have not occurred. He has always been a large eater, very fond of meat, but does not think that he eats inordinately fast, and states that he chews his food fairly well.

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[13] Alt. *Berliner Klin. Woch.*, 1888, pp. 519, 544.

[14] Lemoine et Linossier. *Compt. rend. Soc. de la Biol.* 1893, 9s., v. p. 339.

[1] This patient was shown before the Neurological Society.

Status presens.—The patient is below average height, pale, and somewhat emaciated, and weighs 115 pounds. There is partial consolidation of the right lung; expiration is prolonged and bronchial, particularly toward the manubrium sterni. Fine subcrepitant rales are audible over the infiltrated area. The heart sounds are normal except for accentuation of both second sounds at the base. The liver dullness extends in the mid-clavicular line, from the sixth rib to the costal margin; the spleen is not enlarged.

There is no epigastric tenderness or prominence.

The stomach is apparently not dilated; outlined by means of auscultatory percussion, the long diameter is found to be 16½ cm., the depth 8½ cm. Of the deglutition murmurs, only the first one, that synchronous with swallowing is audible.

There is lateral spinal curvature; the back is dotted over with small areas of atrophy of the natural pigment.

Tubercle bacilli are present in the sputum. Examination of the blood gave 4,975,000 red corpuscles, 12,500 white corpuscles, and 82% hemoglobin. The fact that the count was made about an hour and a half after a large meal may explain the slight leukocytosis.

The urine is normal.

The habit of ruminating, the existence of which was discovered on investigating the patient's history, first manifested itself about twenty years ago; he cannot recall the circumstances connected with its onset, but is positive that at the time he was in perfect health, regular in his habits, not dyspeptic, nor had he seen anyone subject to the same affection.

From that day until the present writing he has, with occasional intervals of short duration, presented the following condition: About half an hour after meals the food begins to return to the mouth without the slightest effort and without the faintest intimation of nausea, and possessing its natural taste. He has no diffulty in distinguishing the kinds of food—if he had eaten of a large number of articles, he could readily differentiate among them. The quantity regurgitated is small and fills the mouth comfortably. If he is out in the open, he generally rejects the food; but if indoors, or in the cars, or busily engaged, he swallows it again. Regurgitation is most apt to occur after the noon-day meal.

As a rule the material is finely enough divided not to require a second chewing, but at times it contains pieces of meat of considerable size, these he picks out and remasticates before swallowing.

The whole process repeats itself at intervals of from five to ten minutes, for about one and a half to two hours; when he is sitting quietly the intervals are somewhat longer. At the end of rumination the food tastes just as pleasantly as at the beginning.

At times, however, the stomach contents become sour; when such a condition exists, the regurgitation continues for about three hours, the material constantly growing more acid until it tastes like vinegar and nearly "cuts his throat" as he expresses it.

He can neither suppress nor inaugurate the process of regurgitation directly, but by assuming the recumbent position he can check it unless he has eaten certain articles, like rice-pudding or smoked meats.

The order in which the food returns depends less upon the order in which it is ingested than upon its nature. Rice-pudding, he thinks, whether eaten first or last, would always come up first. The particular articles which are most liable to be regurgitated are, rice-pudding, smoked sausage, smoked fish, especially mackerel; eggs, ham, pie, and other sweetmeats; at times bread and butter.

Among liquids, he names porter and beer. Beer, he states, comes back as frothy and refreshing as when he drank it; indeed, he thinks, he enjoys it more the second time; whisky does not return; coffee does; tea does not; milk is regurgitated uncurdled for half an hour after ingestion.

Rumination is always preceded by a feeling of fulness in the epigastrium; but there is no belching, although eructations are common between meals, after regurgitation has ceased. To the patient it seems as if the food was forced up by gas collecting beneath it and propelling it upward. He is conscious of its entire passage from the stomach along the gullet to the mouth.

Ordinarily, the ingesta return perfectly sweet continuously for days and weeks; he is then entirely comfortable. But at intervals, for unaccountable reasons, the food becomes acid, and after a few days severe, cramp like pains develop on each side of the epigastrium. As soon as the bowels are freely moved, the pains cease and the acidity of the food disappears.

Occasionally, when the acidity reaches an extreme degree, the bowels will become loose spontaneously, the acid material apparently acting as a cathartic.

He has never vomited. When he was asked to what he could compare his symptom, he said it resembled more the chewing of the cud by the cow than anything else.

The regurgitated material is small in amount, semi-liquid, and of a mush-like consistence. The writer had the opportunity of examining it twice, on different days.

It was acid in reaction, and of a sour but not offensive odor. Uffelmann's test indicated a trace of lactic acid; the presence of HCl could not be demonstrated either with Congo-red paper or Günzburg's test. One of the specimens had separated into three distinct layers—the upper and lower consisting of flocculi of food material, the middle of a turbid fluid holding small particles in suspension. The first sample contained two pieces of meat, $1\frac{1}{4}$x$\frac{1}{4}$ and $\frac{3}{4}$x$\frac{1}{4}$ inches respectively.

On one occasion, the gastric contents were removed with the stomach tube, two and one half hours after an unrestricted meal. About 100 c.c. of a sour-smelling liquid containing solid particles were obtained.

The reaction was acid to litmus. HCl was absent, lactic acid was present in considerable amount. The total acidity, which was, of course, not due to HCl, corresponded to 3.4 c.c. of a deci-normal sodium hydrate solution. Neither starch nor erythrodextrin were present; but with Fehling's test a large quantity of sugar was found; a trace of albumin was also present; the presence of propeptone could not be positively determined; there may have been a trace; the biuret test was readily obtained, even after the filtered fluid had been boiled, indicating the presence of peptones.

On boiling the fluid exhaled a most delightful aromatic odor, difficult to describe.

Dr. Stem has treated the patient in various ways; latterly under the use of a carminative mixture containing Oleum caryophylli, Sp. chloroformi, Tr. capsici, Tr. nucis vomicae, and Tr. cardamomi comp., the rumination has ceased. During the last three weeks he has regurgitated the food but once. Yet, strange to say, he feels far more distress in his stomach now than when the rumination was active.

CASE II.—R. B., *æt.* about 60; married; Pennsylvanian by birth; contracting carpenter.

Family history is negative except for the fact that a niece had for a number of years the same trouble from which he suffers. No history of neuroses. Previous history.—The patient had typhoid fever and articular rheumatism in his youth.

He was always a large and rapid eater, his favorite dish being to the present day salt pork. In the fall of 1893 he had influenza from which he recovered rather slowly. He now has tuberculosis of the right lung; the sputum contains tubercle bacilli; the stomach is not dilated; the outline obtained on auscultatory percussion measures 19 cm. transversely, and 10 cm. in depth. Three deglutition murmurs are audible: the first immediately on swallowing; the second in seven, and the third in twenty seconds.

From his early boyhood, perhaps from the age of twelve, until he was twenty-two years old, he was addicted to rumination. He has no idea whatever of the cause of the habit; he was, as has been stated, a large meat eater, and was inclined to bolt the food.

Being in the habit of discarding the regurgitated food, he became greatly reduced in strength, and was treated for a long time by an able country practitioner for dyspepsia, but without effect. Finally, a few doses of a medicine given to him by an herb doctor cured the complaint. He gave the same remedy to his niece with a like result.

Two years ago the condition returned and has persisted until the present day. Rumination begins about five minutes after the ingestion of food and continues for nearly three hours. Generally there are, he thinks, about six distinct acts of regurgitation. There is neither nausea nor vomiting, and the food tastes as sweetly as in the beginning. As a rule he ejects the bolus, but at times swallows it; large pieces are chewed a second time. He has no control over the process, nor can he at will institute it; he has more distress in the stomach when he ruminates than when he does not.

During active out door exercise, the habit is generally in abeyance; inactivity or the dorsal decubitus intensifies it. In this particular he differs from Case I., in whom the phenomenon is most energetic during exercise and least so during repose. The regurgitation is preceded, as in Case I., by a feeling of wind in the stomach.

Among the articles of diet ice-cream, bread, pie, apples, rice-pudding, milk, and especially fat meat are most prone to return. He told the writer that if he ate twenty different dishes, he could distinguish them all in the ruminated matter.

Two small specimens of the food were obtained for examination, one regurgitated one half hour, the other two hours after dinner. Both were sour and semi-solid, the second being somewhat more liquid than the first.

The reaction was acid, HCl was absent, lactic acid was present only in traces, if at all.

On account of the tuberculosis the patient was placed on creasote, with the result that both the pulmonary symptoms and the gastric condition improved, but a complete cure of the rumination has not been achieved.

These two cases, the histories of which have been given, correspond in many particulars, but very strikingly in the fact that the stomach condition is not associated with a general neurasthenic state, as was the rule in a large number of cases reported in literature.

There may be a relaxation of the cardia, but the writer believes this to be a favoring or predisposing, not an etiologic factor. The coexistence of phthisis with the merycismus is merely an accident.

We have in both patients a history of a most too liberal indulgence in meat diet, linked, clearly in Case II. and probably in Case I., with imperfect mastication. The gastric juice in both is deficient in HCl. The first is a common failing, yet rumination is rare; the second may rank among the causal factors of the merycimsus, but achlohydria is not constant; in some cases there has been hyperacidity, it is possible, however, that different conditions of the digestive juices may lead to the same phenomenon, and the writer is inclined to attach considerable importance to the subacidity and consequent fermentation, particularly since both patients ascribe the inauguration of each act of rumination to a distention of the stomach with gas.

The theory of atavism which explains a number of obscure functional and structural anomalies can scarcely be applied to the condition under consideration, as the connection between man and the ruminating herbivora, if there be any, is too remote.

In addition to the two cases which have come under the writer's personal observation, he has heard of two others that presented the symptom at one time but are now free from it. If these two cases be taken into account, we have four instances of rumination, a comparatively large number, which justifies the belief that the condition is more common than the references to it in text-books would seem to indicate. The patient is apt to consider his affection a peculiar form of vomiting,and not until he is carefully questioned, will its true nature be revealed.

The treatment of merycismus is exceedingly unsatisfactory, very few instances of cure being recorded. The carminatives, electricity, nerve sedatives, and other agents have been employed, but as a rule with but temporary results. In those cases in which the gastric juice is greatly altered, a correction of the defect may bring about a cure. Thus in Alt's case, in which hyperacidity existed, treatment directed against that state, permanently stopped the rumination.

In view of the usual underlying condition, neurasthenia, something might be hoped for from an improvement in the patient's general state.

Dr. Robert Chase and Dr. John Chapin, at a meeting of the Phil. Co. Society, presented the subject of "Heredity in Insanity and in Idiocy." (*Medical News*, March 6, 1895.) Dr. Chase presented the general laws which heredity follows, and Dr. Chapin in his paper formulates the conclusion as follows:

"1. Physical characteristics, and those distinguishing the human species are transmissable as an inheritance.

"2. Knowledge, genius and culture are not an inheritance, but depend rather on influence, education and environment. Mental receptivity is transmissible; psychic qualities are not necessarily an inheritance, requiring favorable surroundings and circumstances for growth and development.

"3. Insanity as a disease is not transmissible by inheritance, but may be acquired or evolved from a neurotic heredity as a basis.

"4. A neurotic predisposition is transmissible by inheritance, but there is no absolute rule that it will be transmissible in any given case or in any case.

"5. Ingrading of neurotic temperaments is most conducive to the creation of a neurotic heredity.

"6. Idiocy and imbecility may be a defect, having an origin in consanguineous marriages, parental conditions, accidents, arrested developments, infantile meningitis, tuberculosis, and a lack of potency on the part of one of the parents from unexplainable causes." PHELPS.